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AUTHOR Ciampa, Bartholomew J.
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ABSTRACT

This study was designed to provide statistical analysis of certain curricular characteristics that could be used as a projective device to be considered prior to the implementation of any further changes of curricular or philosophical significance. The population of the study comprised all students at Nasson College in the classes of 1968 through 1975, with the exception of transfer students. Major courses of study were compared in terms of rank in high school class, performance on the Verbal and Nonverbal Scholastic Aptitude Test, and Scholastic Aptitude Test according to majors of first choice and majors at time of graduation. Results indicated that: (1) Although it may be true that certain major programs of study initially attract students who score significantly higher than the populations of other major programs of study, it has been shown that no major program of study either benefits or suffers significantly as the result of the net effect of student mobility. (2) When the curricular requirements of each major program were examined, a relationship indicating programs displaying a high net out-migration trend were found to require the greatest number of course-credit degree requirements, while programs displaying a high net in-migration trend were found to require the lowest number of course-credit degree requirements. (3) No major program of study either benefits or suffers significantly in terms of rank in high school class, or verbal or non-verbal Scholastic Aptitude Test results. (Author/MJM)

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The Academic Pecking Order:

A Statistical Exposé

By

Bartholomew J. Ciampa, Ph. D.

Director of Teacher Training and
Associate Professor of Education

Nasson College, Springvale, Maine

1-207-324-5340

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How many times has it been implied, alluded to, or even blatantly stated that certain major programs within a single purpose college attract the "better" students, or that certain schools or departments within a given university maintain the "highest" standards, or that, for various reasons, the student in-migration or out-migration patterns within certain disciplines are either high or low?

For example, in Charles Silberman's monumental work entitled Crisis In The Classroom a case in point is built through the not-so-subtle implications which permeate Chapter 10; "The Teacher as a Student".

Clearly, education is at the bottom of the graduate school pecking order in the opinion of many. On the undergraduate level, however, this position is a matter of perspective speculation.

One reason for the clarity in the one situation and the nebulous nature of the other, concerning the more common of the undergraduate and graduate disciplines, may be that education is the only one which generally awards a terminal degree other than the Ph.D. It seems to follow that any degree other than the Ph.D. is suspect and, further, if the degree is suspect, then so too is the program leading to it and on in a reverse "buck passing" manner.

This pecking order is evident not only on an inter-institutional and inter-departmental level but also on an intra-institutional and intra-departmental plane as well.

It is frightening that this sort of reasoning is encountered frequently, is rarely confronted, and is passively accepted as an enduring millstone around the neck of the affected discipline.

It is now possible to dissapate the conjecture upon which this pervasive myth is based by applying a technique which utilizes data that are already available on most college and university campuses.

This statistical procedure emerged as a by-product of empirical research which was designed to serve as a statistical model for institutional curricular self-evaluation at a liberal arts college and can be applied broadly to other institutions of higher education.

The precipitating agent in the formulation of the original design, purposes, and hypotheses of this study emerged as the result of the College faculty's decision to modify existing core and major curricular requirements. These modifications came upon the heels of a total re-orientation of the College's goals and objectives which were formulated during the fall semester of the 1969 academic year.

Modifications and re-alignments of such an extensive nature are expected to be made under the most desireable conditions, as the result of the long and intense deliberation of assets and liabilities which might arise as the result of the projected alterations. It is hoped that this sort of deliberations will also reflect the findings of research studies of the College curriculum or, at the very least, a data base from which informed decisions can be made.

At the time of the philosophical and curricular changes noted above, neither a data base nor cogent prior studies were in existence. This caused a question to arise as to whether or not these changes were based upon fact or merely a consensus of conjecture.

As a result it was decided to design a study which would provide statistical analyses of certain College curricular characteristics and which could be used as a projective device to be considered prior to the implementation of any future changes of curricular or philosophical significance. This study, it was hoped, would supply the necessary information which could lead to qualitative considerations of planned change based upon fact as opposed to conjecture or subjective opinion.

It was felt that in order for one to completely understand the present state of the institution it would be necessary to first become familiarized with the nature of the philosophical and curricular evolution of the College. For this reason the College's philosophical and curricular history from its founding in 1912 to the present were included.

These histories are intended to serve to provide insights to possible future trends.

In addition, it was decided that a statistical data base and analysis vis-a-vis

each of the College's major courses of study, divisions of instruction, and all-College core requirements, could be synthesized as the result of data available in the individual student's cumulative folders which are kept on file in the office of the Registrar.

As the result of reviewing prior research concerning the prediction of success of students' college performance, it was found that the three data items that are readily available regarding nearly all in-coming college students are; (1.) Rank In High School Class; (2.) Verbal - College Entrance Examination Board - Scholastic Aptitude Test results; and (3.) Non-verbal - College Entrance Examination Board - Scholastic Aptitude Test results.

Some examples of research studies which dealt with these criteria as predictors of academic success were Chauncey and Frederickson's[1] findings that correlated College Entrance Examination Board - Scholastic Aptitude Test results and freshmen grades for several entering groups of Harvard and Princeton freshmen; Bloom and Peters'[2] research at the National Registration Office at the University of Chicago using the College Entrance Examination Board - Scholastic Aptitude Test in conjunction with both secondary and college grades; Summerskill's[3] investigations of Scholastic Aptitude Test scores in relation to subsequent attrition from college; and Stern's[4] correlations of the Intellectual Climate section of the College Climate Index to the College Entrance Examination Board - Scholastic Aptitude Test verbal score. Jencks and Reisman[5] further reinforced the Validity of the choice of the instruments when they stated that these were the best of any known forecasting devices in predicting college achievement.

In order to insure the validity of any trend generalization it was decided to use eight consecutive College graduating classes (the four most recently graduated classes, and the four incumbent classes) for the population of the study.

[1]Chauncey and Fredericksen, "The Functions of Measurement In Educational Placement", pp. 85-116.
[2]Bloom and Peters, The Use of Academic Prediction Scales, pp. 60-61.
[3]Summerskill, "Dropouts from College", p. 635.
[4]Stern, People In Context, p. 141.
[5]Jencks and Reisman, The Academic Revolution, pp. 123-124.

The population of the study, therefore, was composed of all students enrolled at the college in the classes of 1968 through 1975 with one notable exception.

Students who had transferred into the College and had earned more than thirty semester hours of course credit at other institutions of higher learning were not included within the population of the study under the assumption that such transfer students' choices of major courses of study were influenced by factors encountered prior to their joining the Nasson student body. Since the study was to be concerned, in a large part, with the mobility of students from one curricular component to another, within the College, it was assumed that a higher degree of validity could be realized by excluding such transfer students from the study population, thereby maintaining more of a "closed system" for consideration.

Twenty-five null hypotheses were formulated which provided for the examination of:

a. Rank In High School Class, Verbal - Scholastic Aptitude Tests results, Non-verbal - Scholastic Aptitude Test results of each division of instruction in relation to national norms on both input and output basis.

b. Differences between input and output characteristics of Rank In High School Class, Verbal - Scholastic Aptitude Test results, Non-verbal - Scholastic Aptitude Test results, within each major program of study.

c. Differences between major programs of study when Rank In High School Class, Verbal - Scholastic Aptitude Test, Non-verbal - Scholastic Aptitude Test results were considered on an input and output basis.

d. Differences between major programs of study with respect to students' in-migration to one program from another, or out-migration from one program to another.

e. Differences between divisions of instruction when Rank In High School Class, Verbal - Scholastic Aptitude Test results, Non-verbal - Scholastic Aptitude Test results were considered on an input and output basis.

f. Differences between divisions of instruction with respect to students' in-migration to one division from another, or out-migration from one division to another.

The hypotheses were accepted or rejected on the basis of either chi-square tests, t-tests, or one-way analyses of variance (wherever applicable in each case) at the .05 level of significance.

Expected chi-square values for all Rank In High School Class and Scholastic Aptitude Test tables were obtained from Educational Testing Services, Princeton, New Jersey.

Whenever possible, statistical results were obtained with the aid of a Hewlett-Packard 9100B computor.

The computing system was chosen because of its versatility and ease of operation. It is programmed either by use of the keyboard or by magnetic cards. The program mode allows entry of program instructions, via the keyboard, into program memory. No language or code conversions are required.

The self-contained magnetic cardreader/recorder can record programs from program memory onto wallet-sized magnetic cards. The reader/recorder can also read the magnetic cards back into program memory for repetitive use. Two programs of 392 steps each may be recorded on each reusable card and cards may be cascaded for longer programs. (In other words, one wallet-sized magnetic card takes the place of a program "stack" of cards for most statistical applications.)

Also available is: an extended memory unit offering expanded storage capacity, which, when attached to the 9100 basic unit, will provide an additional 248 registers which allow greater programming and data handling flexibility; a plotter which provides permanent graphic solutions to solved statistical problems; a marked card reader for conventional card-format program entry; print-out capability; and a large screen display adapter.

Examination of the data revealed that:

a. Significant statistical differences <u>did</u> exist when the Rank In High School Class, Verbal - Scholastic Aptitude Test, and Non-verbal -

Scholastic Aptitude Test results of each division of instruction were compared to national norms on either an input or output basis.

b. Significant statistical differences did not exist between input and output characteristics of Rank In High School Class, Verbal - Scholastic Aptitude Test, and Non-verbal - Scholastic Aptitude Test within each major program of study.

c. Significant statistical differences between major programs of study did exist when Non-verbal - Scholastic Aptitude Test results were considered on an input and an output basis, and did not exist when Rank In High School Class and Verbal - Scholastic Aptitude Test results were considered on an input and an output basis.

d. Significant statistical differences did exist between major programs of study with respect to students' in-migration to one program from another, and out-migration from one program to another.

e. Significant statistical differences between divisions of instruction did exist when Rank In High School Class or Non-verbal - Scholastic Aptitude Test results were considered, and did not exist when Verbal - Scholastic Aptitude Test results were considered on both an input and an output basis.

f. Significant statistical differences between divisions of instruction did exist with respect to students' in-migration to one division from another, or out-migration from one division to another.

When major courses of study were compared in terms of Rank In High School Class, performance on the Verbal - Scholastic Aptitude Test and Non-verbal - Scholastic Aptitude Test according to majors of first choice and majors at time of graduation, significant statistical differences occurred only when Non-verbal - Scholastic Aptitude Test results were compared in each case.

Therefore it can be assumed that no significant statistical changes occurred with respect to Rank In High School Class, or Scholastic Aptitude Test characteristics as a direct result of student mobility from major to major.

Also, when divisions of instruction were compared on the basis of the same characteristics it was found that statistically significant differences occurred when Rank In High School Class was considered and when Non-verbal - Scholastic

Aptitude Test results were considered.

In each case these significant differences occurred both when divisions of instruction of first choice and divisions of instruction at time of graduation were considered.

These results also reinforce the notion that no significant statistical changes occurred as the result of student mobility.

Speculation regarding the above findings was warranted because statistical significance occurred when student mobility patterns were examined. This significance occurred when major courses of study were compared regarding the in-migration of students from one major to another and also regarding the out-migration of students to one major from another.

The same results occurred when divisions of instruction were compared in terms of both in-migration and out-migration patterns.

These findings reinforce earlier findings which arose as the result of the non-significant statistical differences which occurred when mean Rank In High School Class and performance on the College Entrance Examination Board - Scholastic Aptitude Test at time of first choice were compared to scores at time of graduation.

Hence, although considerable mobility exists between major courses of instruction, the net effect of College-wide in-migration or out-migration from major to major does not significantly alter the statistical characteristics of any of the major courses of study.

At the institution in question, the findings of the study suggested that:

1. Although it may be true that certain major programs of study initially attract students who score significantly higher than the populations of other major programs of study (on the Non-verbal - Scholastic Aptitude Test only), it has been shown that no major program of study either benefits or suffers significantly as the result of the net effect of student mobility. This was true regardless of whether the program of study displayed trends of net in-migration, net out-migration, or relative net stability of numbers of students even when considerable mobility took place.

2. When the curricular requirements of each major program were examined in the light of migration patterns the following relationship was found. Programs displaying a high net out-migration trend were found to require the greatest number of course-credit degree requirements while, on the other hand, programs displaying a high net in-migration trend were found to require the lowest number of course-credit degree requirements. It is obvious that a cause and effect relationship exists in this case because it is simply less complicated for a student to migrate into a major program with fewer course-credit requirements than it is to migrate into a program with more requirements, which, in the latter case, could necessitate an extension of the traditional four-year undergraduate experience.

3. Since significant differences exist between major programs of study regarding in-migration and out-migration patterns, and since it has been shown that no major program of study either benefits or suffers significantly in terms of Rank In High School Class, Verbal or Non-verbal - Scholastic Aptitude Test results, it follows that other causes for student mobility should be questioned. Such causes might be related to course-credit requirements, non-quantifiable positive or negative faculty characteristics, and/or non-quantifiable positive or negative student characteristics.

Conclusion

The limitations placed upon the evaluation of undergraduate curricula include, among others:

1.) Data gathering and data base organization.

(Storage, retrieval, etc.)

2.) The choice of a computing system which:

a.) is relatively inexpensive.

b.) is self-contained and relatively portable.

c.) is easily accessible. (regarding time usage, etc.)

d.) is easily programmed, operated and understood.

e.) has adequate memory and storage capabilities.

Nearly every college has available, (whether in manila folders or computerized in storage banks), the previously cited quantitative data which can be used with

this self-evaluation technique.

The problem that must be first dealt with lies in the coherent organization of this data base toward its utilization in the evaluation model.

The computer application described above satisfies "two worlds"; it gets the job done effectively from an academic point of view without running the risk of "over-computerizing"; and it doesn't put an additional strain on the financial, time, or personnel resources available to academic administrators.

The foundations of the academic pecking order myth were shattered at the institution upon which this study* was focused when it was found that no academic major either significantly benefitted or suffered as the result of the significant in-migration or out-migration patterns (switching of majors) of students that was taking place. In other words, the "better" students were not retained by the "more rigorous" disciplines, and the "lesser" students did not tend to migrate toward the bottom of the pecking order. In fact, the opposite seemed to happen in some instances.

It appears that this self-evaluation technique has the potential to undermine the fallacies upon which the myth has persisted if the desire exists to do so. The question at hand, therefore, is whether or not the potential will be realized through personal institutional commitment and initiative.

Beyond this point we are clearly responsible for the adjudication of the technique and subsequently for the eradication of the myth.

It's now up to us.

*"Curricular Implications of Characteristics of Recent Classes at a Small Liberal Arts Institution", by Bartholomew J. Ciampa, unpublished doctoral dissertation, Boston College, Chestnut Hill, Mass. Available through Dissertation Abstracts International, Volume XXXIII, Number 2, 1972. 454 pp.

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